REMARKS

Entry of the above pursuant to 37 C.F.R. § 1.111 are respectfully requested.

1. Status of the Claims

Claims pending: 1, 4-7, 9-10, and 12-14

Claims canceled: 2-3, 8, and 11

Claims withdrawn: none

Claims rejected: 1, 4-7, 9-10, and 12-14

Claims now amended: 1, 4-6, and 12-13

Claims now canceled: none

Claims now added: 15-20

Claims now pending: 1, 4-7, 9-10, and 12-20

The specification is amended for cross-referencing purposes.

Support for the foregoing amendments to the claims and the new claims can be found, for example, in at least the following locations in the original disclosure: the original claims and the specification, page 1, line 30 through page 2, line 5; page 2, lines 19-31; and page 3, lines 25-35. Neither the amendments to the claims nor the specification introduce any prohibited subject matter.

Amendments have been made without disclaimer of, or prejudice to, any canceled subject matter. Applicants reserve the right to file a continuation and/or divisional on any canceled subject matter.

2. Rejection of the Claims Under 35 U.S.C. § 103(a)

2.1

Claims 1, 5-7, and 9 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Luebke et al. (U.S. Patent No. 5,800,870) (hereafter "*Luebke*") in view of Nagler (U.S. Patent No. 3,784,596) (hereafter "*Nagler*"). The Office asserts that *Luebke* discloses most of the recitations of claim 1, but the Office concedes that *Luebke* does not recite the use of an organic pigment. However, the Office alleges that *Nagler* teaches a paper coating composition

comprising a polymeric binder, organic solvent, rheological modifier, and a pigment, wherein the types of pigment may include inorganic pigments and organic pigments, such as quinacridone red and phthalocyanine blue. The Office further alleges that it would have been obvious to utilize an organic pigment, "such as phthalocyanine or quinacridone (a type of acridine pigment)" as the pigment," because this substitution was a predictable use of a prior art element with a known function.

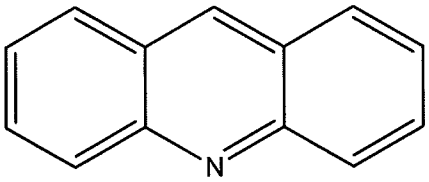
Applicants respectfully traverse the rejection to the extent it is applied to the amended claims. There is no teaching, suggestion, motivation, or other reason to combine *Nagler* with *Luebke*, because a person of ordinary skill in the art could not have predicted that the combination would be operable. *See,* MPEP § 2143(A). The Office alleges that it would have been obvious to substitute an organic pigment, such as quinacridone, into the binder and pigment of *Luebke*. However, this speculation underestimates the problem that *Luebke* was trying to solve. *Luebke* was trying to develop a paper coating composition that could address the issue of foldability while avoiding the runnability issues expected from the substitution of a starch-based binder for a starch-based binder. *See*, col. 2, lines 43-56 of *Luebke*. In view of this goal, *Luebke* discloses a list of only inorganic pigments as useful for the invention of *Luebke*. *See*, col. 5, lines 51-55 of *Luebke*. On the other hand, the list of pigments in *Nagler* are directed toward the use of the binders listed at, e.g., col. 7, lines 62-69 of *Nagler*, which does not mention latex. The list of pigments in *Nagler* may have been equivalent and predictable for the composition of *Nagler*'s invention, but that does not translate to the pigments of *Nagler* being equivalent for the composition of *Luebke*. A person of ordinary skill in the art would not have substituted an organic pigment from *Nagler* into the latex of *Luebke*, because there is no reasonable expectation of success that the combination would have worked. For example, the organic pigments could have caused the runnability issues *Luebke* sought to avoid by using the inorganic pigments. For at least this reason, claim 1 and claims dependent thereon are non-obvious.

Further, claim 1 and claims dependent thereon are non-obvious, because no combination of the cited references teaches or suggests all of the recitations of amended claim 1. A finding of "obviousness requires a suggestion of ***all limitations*** in a claim." *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1342, 68 U.S.P.Q.2d 1940, 1947 (Fed. Cir. 2003) (emphasis added).

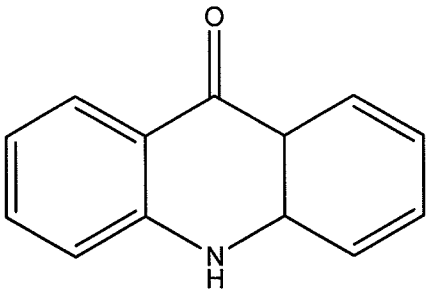
Amended claim 1 recites *inter alia* "the organic colouring pigment is selected from the group consisting of: . . . an acridine." In contrast, ~~the~~ *Nagler* ~~may~~ discloses Quinacridone Red. *See* Col. 6, line 39-42 of *Nagler*.

The Office alleges that Quinacridone Red is a type of acridine. However, Applicants respectfully disagree. Quinacridones may be an acridone, but they are not an acridine. Although an acridine and an acridone may have three aromatic six-membered rings bound together with nitrogen group, an acridone differs from an acridine by the inclusion of a carbonyl group and a hydrogen atom bound to the nitrogen atom. *See*, e.g., < http://en.wikipedia.org/wiki/Acridone>, <http://en.wikipedia.org/wiki/Acridine>; and <http://en.wikipedia.org/wiki/Quinacridone> (all accessed March 22, 2011).

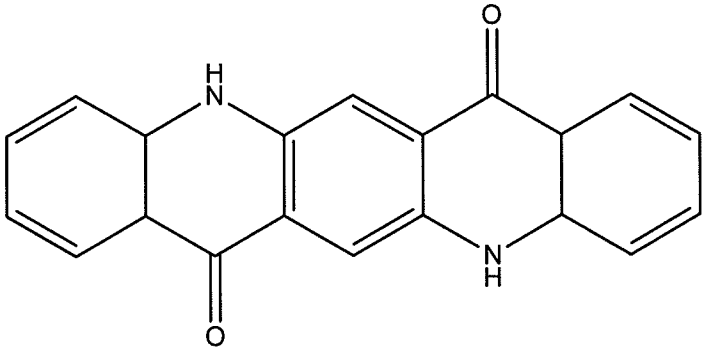
Acridine



Acridone



Quinacridone



This structural difference between an acridine and an acridone places an acridone outside the scope of an acridine. Thus, even if the references are combined as proposed, no combination of the cited references teach or suggest an acridine or any of the other chemical groups recited in claim 1. At the very least, the Office has not established a *prima facie* case of obviousness. Claims 5-7 and 9 depend directly from claim 1. For at least the above reasons, claim 1 and claims dependent thereon are non-obvious. Reconsideration and withdrawal of the obviousness rejection are respectfully requested.

2.2

Claim 4 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Rajaraman (U.S. Patent No. 6,500,896) (hereafter "*Rajaraman*"). The Office asserts that *Rajaraman* discloses a latex based colorant comprising 5-50 percent of a latex based binder, 10-70 percent of a pigment and 0-85 percent water. The Office further alleges that the pigment may include Red Lake C, which the Office alleges is an azo pigment. The Office concedes that the recited ranges are not taught. The Office alleges that it would have been obvious to select any portion of the disclosed ranges, including the claimed ranges.

Applicants respectfully traverse the rejection to the extent the rejection is applied to the amended claim. Amended claim 4 recites *inter alia* a "composition for controlling the bleed fastness of organic colouring pigments in paper coatings comprising . . . an anionic direct dye." In contrast, *Rajaraman* does not appear to disclose at least an "anionic direct dye." For at least this reason, claim 4 is non-obvious. Reconsideration and withdrawal of the obviousness rejection are respectfully requested.

2.3

Claim 4 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Matuki (U.S. Pat. Appl. Pub. 2005/0250891) (hereafter "*Matuki*"). The Office alleges that *Matuki* discloses a water based paint comprising a water based rubber latex, an inorganic or organic pigment, and "at least one selected from the group consisting of a vulcanizing agent", wherein the pigment may be phthalocyanine and the rubber latex may include *inter alia* styrene-butadiene and isoprene rubber. The Office concedes that the recited ranges are not taught. The Office alleges that it would have been obvious to select any portion of the disclosed ranges, including the claimed ranges.

The Office further acknowledges Applicants' arguments that *Matuki* does not teach an organic pigment as recited in claim 4. However, the Office alleges that it would be expected that any organic pigment would function in the invention (presumably of *Matuki*) absent a showing to the contrary.

Applicants respectfully traverse the rejection to the extent the rejection is applied to the amended claim. Amended claim 4 recites *inter alia* a "composition for controlling the bleed fastness of organic colouring pigments in paper coatings comprising . . . an anionic direct dye." In contrast, *Matuki* does not appear to disclose an "anionic direct dye." *Matuki* fails to teach at least this aspect. For at least this reason, claim 4 is non-obvious. Reconsideration and withdrawal of the obviousness rejection are respectfully requested.

2.4

Claims 4, 10, and 12-14 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over WO 01/90263 to Krishnan et al. (hereafter "*Krishnan*"). The Office alleges that *Krishnan* teaches a latex polymer based ink comprising (a) water; (b) a latex polymer; (c) pigment; (d) an acid neutralization agent; and (e) a rewetting agent. The Office alleges that the pigment may include any of those that are suitable for formulating offset lithographic printing inks, such as CI Pigment Yellows and CI Pigment Oranges. The Office concedes that *Krishnan* does not teach or suggest that the composition is for controlling the bleed fastness. However, the

Office asserts that the future use of a composition adds little or no patentable weight to a composition claim when the composition is the same.

Applicants respectfully traverse the rejection to the extent the rejection is applied to the amended claims. Amended claim 4 recites *inter alia* a "composition for controlling the bleed fastness of organic colouring pigments in paper coatings comprising . . . an anionic direct dye." In contrast, *Krishnan* does not appear to disclose an "anionic direct dye." *Krishnan* does not teach or suggest at least this limitation. For at least this reason, claim 4 is non-obvious. Reconsideration and withdrawal of the obviousness rejection are respectfully requested.

3. New Claims

Claims 15-20 are not under rejection. Applicants respectfully submit that claims 15-20 are novel and non-obvious, because none of the cited references discussed above appear to teach or suggest at least "an anionic direct dye."

CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited. Applicants' representative is signing in his capacity under 37 C.F.R. §1.34 on behalf of Applicants.

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayments to Deposit Account 50-0573. This paragraph is intended to be a CONSTRUCTIVE PETITION FOR EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,
RAY DAVENPORT et al.

Date: April 13, 2011

By: _____
William R. Childs, Ph.D.
Registration No. 62,316

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Acridone

From Wikipedia, the free encyclopedia

Acridone is an organic compound based on the acridine skeleton, with a carbonyl group at the *9* position. It may be synthesized by the self-condensation of *N*-phenylanthranilic acid.[1]

Derivatives

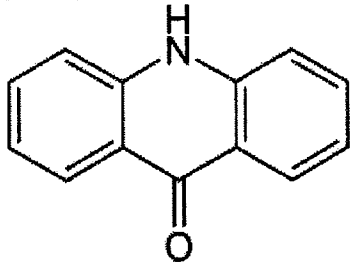
Acridone constitutes the scaffold of some synthetic compounds with various pharmacological activities. One of the most important derivatives of acridone is acridone acetic acid (also known as Neovir), an antiviral drug. More recent derivatives still in its development stage, including 3-chloro-6-(2-diethylamino-ethoxy)-10-(2-diethylamino-ethyl)-acridone, have shown some promise as a potential antimalarial drugs.[2][3]

References

1. ^ C. F. H. Allen and G. H. W. McKee (1943), "Acridone", *Org. Synth.*, http://www.orgsyn.org/orgsyn/orgsyn/prepContent.asp?prep=cv2p0015; *Coll. Vol.* **2**: 15
2. ^ HISASHI FUJIOKA, YUKIHIRO NISHIYAMA, HIROSHI FURUKAWA, AND NOBUO KUMADA (1989). "In Vitro and In Vivo Activities of Atalaphillinine and Related Acridone Alkaloids against Rodent Malaria". *Antimicrobial Agents and Chemotherapy* **33** (1): 6–9. PMC 171411. PMID 2653215. http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pmcentrez&artid=171411.
3. ^ Kelly, Jane X.; Smilkstein, Martin J.; Brun, Reto; Wittlin, Sergio; Cooper, Roland A.; Lane, Kristin D.; Janowsky, Aaron; Johnson, Robert A.; Dodean, Rozalia A.; Winter, Rolf; Hinrichs, David J.; Riscoe, Michael K. (2009). "Discovery of dual function acridones as a new antimalarial chemotype". *Nature* **459** (7244): 270–273. doi:10.1038/nature07937. PMID 19357645.

Retrieved from "http://en.wikipedia.org/wiki/Acridone"

Categories: Ketones | Acridines

Acridone	
	
IUPAC name	
10H-acridin-9-one	
Identifiers	
CAS number	578-95-0
PubChem	2015
ChemSpider	10188539 ✓
ChEMBL	CHEMBL436589 ✓
SMILES	
C1=CC=C2C(=C1)C(=O)C3=CC=CC=C3N2	
O=C1c3ccccc3Nc2ccccc12	
InChI	
InChI=1S/C13H9NO/c15-13-9-5-1-3-7-11(9)14-12-8-4-2-6-10(12)13/h1-8H,(H,14,15) ✓ Key: FZEYVTFCMJSGMP-UHFFFAOYSA-N ✓	
InChI=1/C13H9NO/c15-13-9-5-1-3-7-11(9)14-12-8-4-2-6-10(12)13/h1-8H,(H,14,15) Key: FZEYVTFCMJSGMP-UHFFFAOYAI	
Properties	
Molecular formula	$C_{13}H_9NO$
Molar mass	195.22 g mol^{-1}
✓(what is this?) (verify) Except where noted otherwise, data are given for ~~materials in their standard state (at 25 °C, 100 kPa)~~	
Infobox references	

Quinacridone

From Wikipedia, the free encyclopedia

Quinacridone is a red powder. It is an organic compound with the molecular formula $C_{20}H_{12}N_2O_2$. It is used as a pigment; analogs bearing this motif are known as **quinacridones**.

Quinacridones

Quinacridones are a family of synthetic pigments used to make high performance paints. Quinacridones are considered "high performance" pigments because they have exceptional color and weather fastness. Major uses for quinacridones include automobile coatings as well as other industrial coatings. They can also be used in artist's paints, including oils, acrylics, and watercolors.

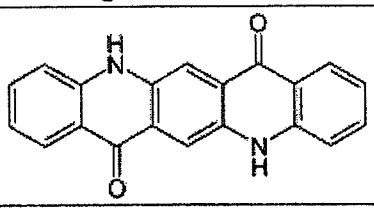
Typically deep red to violet in color, the hue of quinacridone is affected not only by the R-groups on the molecule but by the crystal form of the solid. For example, the γ crystal modification of unsubstituted quinacridone provides a strong red shade that has excellent color fastness and resistance to solvation. Another important modification is the β phase which provides a maroon shade that is also more weather resistant and light-fast. Both crystal modifications are more thermodynamically stable than the α crystal phase.

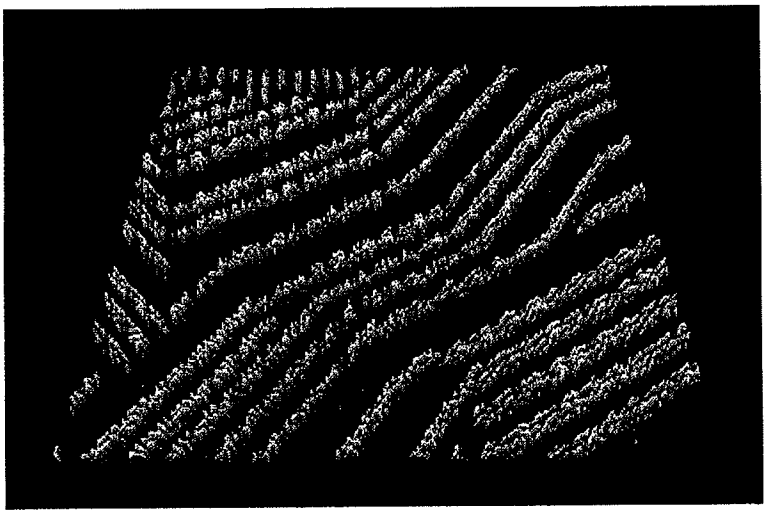
Basic modifications to the chemical structure of quinacridones include the addition of CH_3 and Cl substituents.

Some magenta shades of quinacridone are labeled under the proprietary name "Thio Violet" and "Acra Violet".

Semiconductor

Quinacridone can form a self-assembling, supramolecular organic semiconductor. The following image, taken by a scanning tunneling microscope, shows these self-assembled quinacridone chains on a graphite background.

Quinacridone	
	
IUPAC name	
5,12-Dihydro-quino[2,3-*b*]acridine-7,14-dione	
Other names	
C.I.: 73900, Pigment Violet 19	
Identifiers	
CAS number	1047-16-1 ✓
PubChem	13976
ChemSpider	13369 ✓
UNII	11P487375P ✓
SMILES	
O=C4c5ccccc5Nc3cc2C(=O)c1c(cccc1)Nc2cc34	
InChI	
InChI=1S/C20H12N2O2/c23-19-11-5-1-3-7-15(11)21-17-10-14-18(9-13(17)19)22-16-8-4-2-6-12(16)20(14)24/h1-10H,(H,21,23)(H,22,24) ✓ Key: NRCMAYZCPIVABH-UHFFFAOYSA-N ✓	
InChI=1/C20H12N2O2/c23-19-11-5-1-3-7-15(11)21-17-10-14-18(9-13(17)19)22-16-8-4-2-6-12(16)20(14)24/h1-10H,(H,21,23)(H,22,24) Key: NRCMAYZCPIVABH-UHFFFAOYAK	
Properties	
Molecular formula	$C_{20}H_{12}N_2O_2$
Molar mass	312.32 g mol^{-1}
Appearance	Red powder (nanoparticles)
Density	1.47 g/cm^3
Solubility in water	Insoluble
✓(what is this?) (verify) Except where noted otherwise, data are given for materials in their standard state (at 25 °C, 100 kPa)	
Infobox references	



References

Acridine

From Wikipedia, the free encyclopedia

Acridine, $C_{13}H_9N$, is an organic compound and a nitrogen heterocycle. Acridine is also used to describe compounds containing the $C_{13}N$ tricycle.

Acridine is structurally related to anthracene with one of the central CH groups is replaced by nitrogen. Acridine, a colorless solid, was first isolated from coal tar. It is a raw material used for the production of dyes and some valuable drugs. Many acridines, such as proflavine, also have antiseptic properties. Acridine and related derivatives bind to DNA and RNA due to their abilities to intercalate. Acridine orange (3,6-dimethylaminoacridine) is a nucleic acid-selective metachromatic stain useful for cell cycle determination. Acridarsine is formally derived from acridine by replacing the nitrogen atom with one of arsenic, and acridophosphine by replacing it with one of phosphorus.

Contents

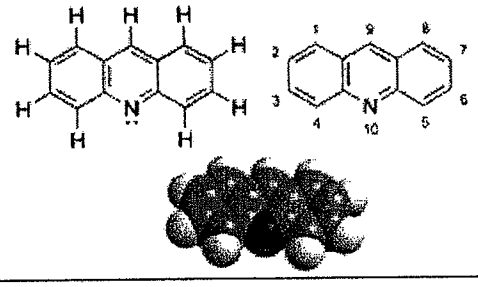
History

Acridine was first isolated in 1871 by Carl Gräbe and Heinrich Caro.

Sources

Acridine occurs naturally in coal tar. It is separated from coal tar by extracting with dilute sulfuric acid; addition of potassium dichromate to this solution precipitates acridine bichromate. The bichromate is decomposed using ammonia.

Many synthetic processes are known for the production of acridine and its derivatives. A.

Acridine	
	
IUPAC name	
Acridine	
Identifiers	
CAS number	260-94-6 ✓
PubChem	9215
ChemSpider	8860 ✓
ChEMBL	CHEMBL39677 ✓
SMILES	
n1c3c(cc2c1cccc2)cccc3	
c1ccc2c(c1)cc3ccccc3n2	
InChI	
InChI=1S/C13H9N/c1-3-7-12-10(5-1)9-11-6-2-4-8-13(11)14-12/h1-9H ✓ Key: DZBUGLKDJFMEHC-UHFFFAOYSA-N ✓	
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Properties	
Molecular formula	$C_{13}H_9N$
Molar mass	179.22 g mol^{-1}
Melting point	107 °C
Boiling point	346 °C
Acidity (pK_a)	5.60[1]
✓(what is this?) (verify) Except where noted otherwise, data are given for materials in their standard state (at 25 °C, 100 kPa)	
Infobox references	

Bernthsen condensed diphenylamine with carboxylic acids, in the presence of zinc chloride in the Bernthsen acridine synthesis. With formic acid as the carboxylic acid the reaction yields acridine itself, and with the higher homologues the derivatives substituted at the meso carbon atom are generated.

Other older methods for the organic synthesis of acridines include condensing diphenylamine with chloroform in the presence of aluminium chloride, by passing the vapours of orthoaminodiphenylmethane over heated litharge, by heating salicylic aldehyde with aniline and zinc chloride to 260 °C or by distilling acridone (9-position a carbonyl group) over zinc dust.

A general method for acridine synthesis is the cyclisation of *N*-phenylanthranilic acid or 2-(phenylamino)benzoic acid with phosphoric acid.

A classic method for the synthesis of acridones is the Lehmstedt-Tanasescu reaction.

Physical properties

Acridine and its homologues are stable compounds of weakly basic character. Acridine has a pKa of 5.6, which is similar to that of pyridine. It also shares properties with quinoline which is the single fused homologue. Acridine crystallizes in needles which melt at 110 °C. It is characterized by its irritating action on the skin, and by the blue fluorescence shown by solutions of its salts.

Chemical properties

Acridine combines readily with alkyl iodides to form alkyl acridinium iodides, which are readily transformed by the action of alkaline potassium ferricyanide to *N*-alkyl acridones. On oxidation with potassium permanganate it yields acridinic acid $C_9H_5N(COOH)_2$ or quinoline-1,2-dicarboxylic acid.

Acridine is easily oxidized by peroxymonosulfuric acid to the acridine amine oxide. The carbon 9-position of acridine is activated for addition reactions. The compound is reduced to the 9,10-dehydroacridine and reaction with potassium cyanide gives the 9-cyano-9,10-dehydro derivative.

Numerous derivatives of acridine are known and may be prepared by methods analogous to those used for the formation of the parent base. 9-Phenylacridine is the parent base of chrysaniline or 3,6-diamino-9-phenylacridine, which is the chief constituent of the dyestuff phosphine (not to be confused with phosphine gas), a by-product in the manufacture of rosaniline.

Chrysaniline forms red-coloured salts, which dye silk and wool a fine yellow; and the solutions of the salts are characterized by their fine yellowish-green fluorescence. Chrysaniline was synthesized by O. Fischer and G. Koerner by condensing ortho-nitrobenzaldehyde with aniline, the resulting ortho-nitro-para-diamino-triphenylmethane being reduced to the corresponding orthoamino compound, which on oxidation yields chrysaniline.

Benzoflavin, an isomer of chrysaniline, is also a dye-stuff, and has been prepared by K. Oehler from meta-phenylenediamine and benzaldehyde. These substances condense to form tetra-aminotriphenylmethane, which, on heating with acids, loses ammonia and yields 3,6-diamino-9,10-dihydrophenylacridine, from which benzoflavin is obtained by oxidation. It is a yellow powder, soluble in hot water.

Cancer link

Acridine is a known human carcinogen. It causes mutations in incorporating into the DNA, and doing so creating an additional base on the opposite strand.[2] If that mutation occurs in a coding sequence, it almost always leads to inactivation of the protein it encoded.

References

1. ^ Brown, H.C., et al., in Baude, E.A. and Nachod, F.C., *Determination of Organic Structures by Physical Methods*, Academic Press, New York, 1955.
2. ^ Herman RK, Dworkin NB (May 1971). "Effect of gene induction on the rate of mutagenesis by ICR-191 in Escherichia coli". *Journal of Bacteriology* **106** (2): 543–50. PMC 285129. PMID 4929867. http://jb.asm.org/cgi/pmidlookup?view=long&pmid=4929867. Retrieved 2010-05-15.

- *Synthesis of Acridine-based DNA Bis-intercalating* Agents Gerard P. Moloney, David P. Kelly, P. Mack Molecules **2001**, 6, 230-243 [1] open source
- This article incorporates text from a publication now in the public domain: Chisholm, Hugh, ed (1911). *Encyclopædia Britannica* (Eleventh ed.). Cambridge University Press.

External links

- Synthesis of acridone in *Organic Syntheses* **19**:6; *Coll. Vol.* **2**:15 [2] from o-chlorobenzoic acid and aniline in a Goldberg reaction.
- Synthesis of 9-aminoacridine in *Organic Syntheses* **22**:5; *Coll. Vol.* **3**:53. [3] from N-phenylanthranilic acid.

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